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not see his way clear to accept Bizzozero's theory of the regeneration of the cells covering the villi, as it is the only plausible explanation of it. It does not seem to us that a shifting of the cells from the crypts to the villi necessarily proves that the crypts are not glands, for it is by no means shown that the function of the cells covering the villi is only to absorb. It may also be to secrete. The large number of goblet cells would appear to indicate this. Moreover, similar instances corroborative of Bizzozero's theory are not wanting, as, for instance, in the central nervous system and in the epidermis, and until it is proved to be incorrect it seems to us that it is well to retain the theory.

The mucosa proper is the most complex portion of the intestine, as the folds, villi, and villi upon folds, are only modifications of a simpler membrane. In the mucosa we have all of the characteristics of a lymph gland, extending from the muscularis mucosæ into the folds and villi. Between the bases of the villi and the muscularis mucosæ, the crypts, when present, are lodged. The connective-tissue frame-work of the mucosa has been shown to be composed of fibers, neither white fibrous nor yellow elastic, which are constantly anastomosing to form a reticulum identical with that of lymph nodules. Siegfried has recently shown that they are composed of a body rich in sulphur and phosphorus, which he has called 'reticulin.' Oppel gives a good discussion of this tissue and its importance. Below the crypts the lymphatic tissue is arranged in a layer known as the stratum granulosum.

Between the stratum granulosum and the muscularis mucosæ there is an additional hyaline membrane. This layer had been observed a number of times in the stomach and intestine of various animals and was isolated and discussed by Mall as the stratum fibrosum. Oppel objects to this name, as there had been a difference of opinion regarding its constitution, and substitutes for it the name stratum compactum. Since the appearance of Oppel's book, however, Spalteholz has shown conclusively that this layer is really composed of white fibrous tissue, and, therefore, the name stratum fibrosum is still appropriate. It is to be regretted that Spalteholz's paper appeared

too late to be used by Oppel, for the introduction of new terms has a tendency to add confusion to the subject.

The description of Brunner's glands, the lymphatic vessels and nodules, the blood-vessels and nerves is extensive and complete, but it is of such a nature that it cannot be given in a brief review.

The above shows the extent and some of the features of the book. It is a mine of facts arranged in such a manner that anything in it can be easily found. If the work were more critical it would be of much greater value. But as it stands it is a great addition to our literature and will be welcomed by all students of anatomy. FRANKLIN P. MALL.

*Whittaker's Mechanical Engineer's Pocket-book.*

By PHILIP R. BJÖRLING. London, Whittaker & Co.; New York, The Macmillan Co. 1898. 32mo. Pp. 377. Illustrations. Price, \$1.75.

This is a 'pocket-book' of the now standard form and page, and including the usual compilation of tables and data for use in the design of machinery and works of engineering. It is neatly put up and well bound, with good paper and clear type of larger size than the microscopic print often seen in such books, vexing the eye and trying the patience of the reader. The first section of the book is devoted to hydraulics and water-wheels, and is exceptionally extensive for a compilation of this size. The section on steam-engines includes modern forms, and gives the proportions of the later constructions. The empirical but standard rules of construction are given, as customarily employed by British designers, and good tables of hyperbolic logarithms and of mean pressures are added. Proportions of details of machine-construction are given very fully, no space being given up to references. The usual and always necessary numerical tables conclude the work.

R. H. T.

*The Entropy-Temperature Analysis of Steam-Engine Efficiencies.* Prepared by SIDNEY A. REEVE, M.E. New York, Progressive Age Co. 1897. 8vo. Pp. 20, with large folded diagram.

Since the publication of the now famous

paper of Professor J. Willard Gibbs, on 'Graphical Methods in Thermodynamics,' in the Transactions of the Connecticut Academy of Sciences, 1873, the 'entropy-temperature diagram' has attracted little attention until within a comparatively few years. Brought out by that writer twenty-five years ago, it was left unnoticed for a long time, and it was only when, recently, the eminent and able mathematical physicist and engineer, Mr. J. MacFarlane Grey, employed it in his papers, read before the British Institution of Naval Architects, and later, Professor Cotterill took it up, and the late Mr. Willans gave it practical application in the exposition of the experimental work on his engines which gave him fame, that it has been thought worth while, on the part of engineers, to make use of what proves to be a very beautiful method of exhibiting heat-exchanges and transformations in heat-engine cycles, and especially with the steam-engine.

The recent publication of Professor Ewing on the steam-engine, in which this system is employed to some extent, has called attention to the subject once more, and the indications would seem to be that the entropy-temperature diagram will now find frequent use in the hands of the engineer in the exposition of thermodynamic problems.

The particular form given this diagram, in order to make it available for general use, in this publication by Professor Reeve, is that adopted by Professor Boulvin, of Ghent University, modified by the present author to meet the demands of the profession in a more complete and satisfactory manner. It exhibits the four quadrants, devoted in the present case to entropy-volume changes of steam, to volume-pressure, to temperature-pressure and to entropy-temperature variations, taking the series clockwise, and exhibiting the various curves drawn to a moderately large scale. There are also printed upon the sheet the proper tables and blanks for use in tabulating data of steam-engine trials. Accompanying is a text, descriptive of the diagram and its uses, indicating the character of its lines and the methods of analysis appropriate to the purposes of the engineer.

The text is concise and clear and the plate well made. It would be an improvement were the latter given a light and strong cloth backing, and were a pocket supplied in the cover of its text, in which to preserve it. The cost would be slightly increased, but the sheet would be thus rendered comparatively safe. With care in mounting, and inspection afterward, the diagram could probably be thus guarded without measurable distortion.

The diagram should find many users and prove of real assistance to many investigators and illustrators of thermodynamic problems.

R. H. THURSTON.

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#### SOCIETIES AND ACADEMIES.

ANTHROPOLOGICAL SOCIETY, WASHINGTON.

THE 274th regular meeting of the Anthropological Society was held Tuesday, March 1, 1897.

Dr. J. Walter Fewkes read a paper on 'The Altar of the Great Snake of Walpi,' which he described in detail, and stated it to be different from those of the Snake Dance proper.

A number of illustrations, colored charts and drawings were used to show the structure and construction of the altar.

In his paper on 'Snake Worship among the Navaho,' Dr. Matthews stated that the Navahoes have ophiolatrous rites; but they do not handle or introduce live snakes after the manner of the Moki. While their rites do not seem to be derived directly from those of the Moki both have much in common and are probably borrowed from a common source; still they differ in many important respects. The ceremonial circuits are different. A Navaho will not kill a snake; if he finds one coiled in his path he will lift it gently with a stick and throw it to one side. They think the serpent possessed of extraordinary wisdom; that it understands human language and may make evil use of human knowledge; hence their most sacred rites may be performed and their myths may be told only in winter, when the snakes are hibernating. A picture was shown which was a copy of a Navaho dry-painting or sand-altar. It might be considered a Navaho snake-altar. It represented the home of the Navaho snake-god; a minute description of it was given.